IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Caius Rommens *et al.*

Title: PRECISE BREEDING

Appl. No.:   10/607,538

Filing   6/27/2003
Date:

Examiner: David T. Fox

Art Unit: 1638

DECLARATION UNDER 37 C.F.R. § 1.132

Commissioner for Patents
PO Box 1450
Alexandria, Virginia 22313-1450

Sir:

1.   I, Caius Rommens, have been employed as Director R&D at J. R. SIMPLOT COMPANY (Boise, Idaho), since 2000.

2.   I have doctorate in Plant Biology from the Free University of Amsterdam. I have worked extensively in agricultural genetics throughout my professional career. Appended as Exhibit A is a copy of my Curriculum Vitae, evidencing this research.

3.   I am the project director and co-inventor of the present application, USSN 10/607,538, which discloses and claims key SIMPLOT technologies. Our invention concerns the transformation of plants without using or necessarily incorporating bacterial or viral or non-plant DNA into the recipient plant's genome.

4.   I also authored the peer-reviewed article Rommens *et al.*, *"Plant-derived transfer DNAs,"* Plant Physiol. 139: 1338-49, 2005, which describes the presently claimed invention, and which was relied on by the Patent Office in the most recent Office Action dated May 9, 2008.

5.   Our method and transformation constructs employ *Agrobacterium*-mediated transformation and associated vectors, but we have modified the transformation system so as to replace the traditional *Agrobacterium* T-DNA border sequences with nucleotide sequences that are native to plants. Specifically, we use what we call "P-DNA borders" which are nucleic acid sequences that are native to the plant genome and which comply with the consensus sequence denoted by SEQ ID NO: 93 in the application, ANGATNTATN$_6$GT.

6.   We have found that in essentially all cases where we have used P-DNA border sequences that comport with SEQ ID NO: 93 in our transformation constructs,

we observe successful transformation of the relevant desired polynucleotide. Please see Exhibit B.

7.   Exhibit B is a table which relates the successful transformation of twenty-seven different plants using P-DNA border sequences that comport with the ANGATNTATN₆GT consensus of SEQ ID NO: 93. Each of the P-DNA border sequences that resulted in successful transformation contained the conserved residues of the SEQ ID NO: 93 consensus, namely A-GAT-TAT------GT. I have highlighted the conserved residues in green.

8.   All of the sequences in the Rommens *et al.*, *"Plant-derived transfer DNAs,"* *Plant Physiol.* 139: 1338-49, 2005, which resulted in successful transformation events, *also* comported with the SEQ ID NO: 93 consensus. SEQ ID NOs: 41, 42, 43, 44, 45, 46, 47, 48, 50, 52, 53, 54, and 55, as depicted in Table 2 of the application, all exactly comport with the SEQ ID NO: 93 consensus.

9.   Thus, it is our contention that a P-DNA border sequence that comports with the consensus depicted in SEQ ID NO: 93 is a functional, plant-derived "border" sequence, and contributes to the transfer of the desired polynucleotide to which it is linked.

10.   Hence, I assert that a successful transformation event is highly probable and predictable if a P-DNA border, which complies with the SEQ ID NO: 93 consensus sequence, is used in the transformation construct, as described in our application.

<div align="center">*   *   *</div>

11.   I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Declarant

Full name of declarant: Caius Rommens

Declarant's signature _____ Date ___9/5/08___

Country of Citizenship: Netherlands

Residence Address: 3395 East Windsong, Boise ID 83712

EXHIBIT A

DR. ROMMENS' CURRICULUM VITAE

Research Experience:

- Director Plant Sciences at J.R. Simplot Company, ongoing from September 2000.
  - o Developed new methods for plant transformation and gene silencing (see, for instance, US Patent 7250554 and Patent Applications 2003/0221213A1, 2005/0034188A1, 2006/0156428A1, and 2008/0134356A1)
  - o Developed new strategies for crop improvement
- Team Leader Disease Control at Monsanto Company, from March 1995 until August 2000
  - o Developed strategies for enhanced disease resistance in agriculturally-important crops (see, for instance, US Patents 6544733, 6506962, 7030293, 7138273, 7148398, and 7294757)
  - o Developed strategies for improved plant transformation (see, for instance, US Patent Application 2004/0133938A1).
- Postdoctoral Fellow at the University of California from January 1993 until February 1995.
  - o Isolated various disease resistance genes (see US Patent 6245510 and 5859351)
- PhD Student at the Free University Amsterdam from Apr 1988 until December 1992.
  - o PhD thesis of December 14th, 1992, entitled "Transposition of the maize Activator element in tomato"

Partial List of Publications:

Rommens CM, Richael CM, Yan H, Navarre DA, Ye J, Krucker M, Swords K (2008) Engineered native pathways for high kaempferol and caffeoylquinate production in potato. Plant Biotechnol J. 2008 Jul 23. [Epub ahead of print]

Rommens CM, Yan H, Swords K, Richael C, Ye J (2008) Low-acrylamide French fries and potato chips. Plant Biotechnol J. 2008 Jul 23. [Epub ahead of print]

Rommens CM (2008) The need for professional guidelines in plant breeding. Trends Plant Sci 13: 261-3.

Richael CM, Kalyaeva M, Chretien RC, Yan H, Adimulam S, Stivison A, Weeks JT, **Rommens CM (2008)** Cytokinin vectors mediate marker-free and backbone-free plant transformation. Transgenic Res. 2008 Mar 5. [Epub ahead of print]

Weeks JT, Ye J, **Rommens CM** (2008) Development of an in planta method for transformation of alfalfa (Medicago sativa). Transgenic Res 17: 587-597.

Rommens CM, Haring MA, Swords K, Davies HV, Belknap WR (2007) The intragenic approach as a new extension to traditional plant breeding. Trends Plant Sci 12: 397-403.

Rommens CM (2007) Intragenic crop improvement: combining the benefits of traditional breeding and genetic engineering. J Agric Food Chem 55: 4281-4288.

Rommens CM, Ye J, Richael C, Swords K (2006) Improving potato storage and processing characteristics through all-native DNA transformation. J Agric Food Chem 54: 9882-9887.

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Yan H, Chretien R, Ye J, **Rommens CM** (2006) New Construct Approaches for Efficient Gene Silencing in Plants. Plant Physiol Jun 9; 141: 1508-1518.

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Rommens CM (2004) All-native DNA transformation: a new approach to plant genetic engineering. Trends Plant Sci 9 :457-464.

Rommens CM, Humara JM, Ye J, Yan H, Richael C, Zhang L, Perry R, Swords K (2004) Crop improvement through modification of the plant's own genome. Plant Physiol 135: 421-31.

Rommens CM, Kishore GM (2000) Exploiting the full potential of disease-resistance genes for agricultural use. Curr Opin Biotechnol 11: 120-125.

Gao AG, Hakimi SM, Mittanck CA, Wu Y, Woerner BM, Stark DM, Shah DM, Liang J, **Rommens CM** (2000) Fungal pathogen protection in potato by expression of a plant defensin peptide. Nat Biotechnol 18: 1307-1310.

Abad MS, Hakimi SM, Kaniewski WK, **Rommens CM**, Shulaev V, Lam E, Shah DM (1997) Characterization of acquired resistance in lesion-mimic transgenic potato expressing bacterio-opsin, Mol Plant Microbe Interact 10: 635-645.

Salmeron JM, Oldroyd GE, **Rommens CM**, Scofield SR, Kim HS, Lavelle DT, Dahlbeck D, Staskawicz BJ (1996) Tomato Prf is a member of the leucine-rich repeat class of plant disease resistance genes and lies embedded within the Pto kinase gene cluster. Cell 86: 123-133.

Rommens CM, Salmeron JM, Oldroyd GE, Staskawicz BJ (1995) Intergeneric transfer and functional expression of the tomato disease resistance gene Pto. Plant Cell 7: 1537-1544.

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Rommens CM, van Haaren MJ, Nijkamp HJ, Hille J (1993) Differential repair of excision gaps generated by transposable elements of the 'Ac family'. Bioessays 15: 507-12.

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Rommens CM, Rudenko GN, Dijkwel PP, van Haaren MJ, Ouwerkerk PB, Blok KM, Nijkamp HJ, Hille J (1992) Characterization of the Ac/Ds behaviour in transgenic tomato plants using plasmid rescue. Plant Mol Biol 20: 61-70.

Rommens CM, van Haaren MJ, Buchel AS, Mol JN, van Tunen AJ, Nijkamp HJ, Hille J (1992) Transactivation of Ds by Ac-transposase gene fusions in tobacco. Mol Gen Genet 231: 433-441.

Rommens CM, van der Biezen EA, Ouwerkerk PB, Nijkamp HJ, Hille J (1991) Ac-induced disruption of the double Ds structure in tomato. Mol Gen Genet 228: 453-458.

Haring MA, **Rommens CM**, Nijkamp HJ, Hille J (1991) The use of transgenic plants to understand transposition mechanisms and to develop transposon tagging strategies. Plant Mol Biol 16: 449-461. Review.

Haring MA, Gao J, Volbeda T, **Rommens CM**, Nijkamp HJ, Hille J (1989) A comparative study of Tam3 and Ac transposition in transgenic tobacco and petunia plants. Plant Mol Biol 13: 189-201.

EXHIBIT B

Name	Sequence	Functional	Reference
SEQID93	----▓▓▓▓▓▓NNNN▓----		
SEQID 54	TGAC▓▓▓▓▓GGTACT▓AAAC	Yes	USSN 10/607,538
SEQID 55	TGGC▓▓▓▓▓ACCGAT▓AAAC	Yes	USSN 10/607,538
Le01(551)	GGCC▓▓▓▓▓TTGTTG▓AATG	Yes	Rommens, 2005**
St02(551B)	GGCC▓▓▓▓▓TTGTTG▓AATG	Yes	Rommens et al., 2005
Ca01(551C)	GGCC▓▓▓▓▓TTGTTG▓AATG	Yes	Rommens et al., 2005
NM114337	TGAC▓▓▓▓▓CGTGAT▓CAAC	Yes	USSN 10/607,538
St03*(605)	ATGC▓▓▓▓▓GCTAAG▓AAAC	Yes	Rommens et al., 2005
St04(737)	AGGC▓▓▓▓▓TTTGGG▓AGGT	Yes	Rommens et al., 2005
Le02(719)	CCGC▓▓▓▓▓TCAGAG▓GAG	Yes	Rommens et al., 2005
Le03*(560)	CCGC▓▓▓▓▓TCAGAG▓ATGC	Yes	Rommens et al., 2005
Le04(724)	TCAC▓▓▓▓▓TAGACA▓TTCC	Yes	Rommens et al., 2005
Le05(609)	GGGC▓▓▓▓▓TTTGGG▓AGGT	Yes	Rommens et al., 2005
Ms01*(820)	CGGC▓▓▓▓▓ACAGAG▓ATAC	Yes	Rommens et al., 2005
SEQID 283	CGGC▓▓▓▓▓TCAATT▓AAAT	Yes	US20070250948A1
Hv01(570)	GGGC▓▓▓▓▓CATTTG▓ATAT	Yes	Rommens et al., 2005
Os01(923)	AGCC▓▓▓▓▓CCTTGA▓AAGT	Yes	Rommens et al., 2005
Os02(924)	ATGC▓▓▓▓▓TTTTTG▓AGTG	Yes	Rommens et al., 2005
Os03(925)	ACAC▓▓▓▓▓ATATACG▓ACAT	Yes	Rommens et al., 2005
Apple	CGGC▓▓▓▓▓ACAGAG▓ATAC	Yes	New from Simplot
Brassica	AGCC▓▓▓▓▓AGTGGT▓AAAC	Yes	New from Simplot
pSIM635	GGGC▓▓▓▓▓TTTGGG▓AGGT	Yes	New from Simplot
Zm01(927)	CCAC▓▓▓▓▓AAATGC▓ACGC	Yes	Rommens et al., 2005
Ta01(928)	GGAC▓▓▓▓▓TGCTCC▓ATAT	Yes	Rommens et al., 2005
SEQID 236	TGAC▓▓▓▓▓GACCTA▓ATTT	Yes	US20070250948A1
SEQID 237	GGAC▓▓▓▓▓GACCTA▓ATTT	Yes	US20070250948A1
SEQID 238	ATGC▓▓▓▓▓TCAGTT▓AAAT	Yes	US20070250948A1
SEQID 239	ATAC▓▓▓▓▓AGTCTT▓AAAT	Yes	US20070250948A1
Petunia	GGAC▓▓▓▓▓ACAAGT▓AAAC	Yes	Conner et al., 2007*
Petunia	TGGC▓▓▓▓▓GTTCTT▓CATG	Yes	Conner et al., 2007*
Mt01(568)	CGGC▓▓▓▓▓ACAGAG▓ATAC	Yes	Rommens et al., 2005
Le06(603)	GGGC▓▓▓▓▓ACAAGT▓AAAC	Yes	Rommens et al., 2005
Le07(549)	GTAC▓▓▓▓▓TTGAGTT▓AAGA	Yes	Rommens et al., 2005
Le08(722)	TTAC▓▓▓▓▓ACAGTG▓AACG	Yes	Rommens et al., 2005
Le09(721)	TTAC▓▓▓▓▓CCAAAA▓ATTC	Yes	Rommens et al., 2005
Le10(608)	TGGC▓▓▓▓▓GCCCAG▓ACAA	Yes	Rommens et al., 2005
Le11(727)	AAGC▓▓▓▓▓CTACAT▓TACC	Yes	Rommens et al., 2005
pSIM566	GGAC▓▓▓▓▓AAAGT▓AAAC	Yes	New from Simplot
pSIM636	TGGC▓▓▓▓▓GCCCAG▓ACAA	Yes	New from Simplot
pSIM734	CGCC▓▓▓▓▓CTTTGT▓AGAA	Yes	New from Simplot

*: Conner AJ, Barrell PJ, Baldwin SJ, Lokerse AS, Cooper PA, Erasmuson AK, Nap JP, Jacobs JME (2007) Intragenic vectors for gene transfer without foreign DNA. Euphytica 154, 341-353.

**Rommens et al., "Plant-derived transfer DNAs," Plant Physiol. 139: 1338-49, 2005